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# Effect of Ti Substitution on the Residual Resistivity in the Spin-Triplet Superconductor $Sr_2RuO_4$

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We report the effect of the substitution of $nonmagnetic$ $Ti^{4+}$ for $Ru^{4+}$ on the in-plane resistivity of $Sr_2Ru_{1-x}Ti_xO_4$. In this study, we used high-quality single crystals with $x$ from 0 (spin-triplet superconductor) to 0.03 (the border of the magnetically ordered phase) [1]. With a small amount of Ti with $x = 0.001$, the superconductivity is completely suppressed reflecting the extreme sensitivity to translational symmetry breaking. In addition, the large enhancement of the in-plane residual resistivity $\rho_{ab0}$ is observed at the rate of $d\rho_{ab0}/dx \sim$ 500 $\mu\Omega$cm up to $x = 0.03$. The rate is in good agreement with the expectation for isotropic scattering in the unitarity limit in a two-dimensional system with $d\rho_{ab0}/dx$ = 425 $\mu\Omega$cm for $Sr_2RuO_4$. This result indicates that the $nonmagnetic$ impurity in $Sr_2RuO_4$ acts as a strong potential scatterer, similar to Zn impurities in the high-$T_c$ cuprates.

[1] M. Minakata and Y. Maeno, cond-mat/0101367.

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